



Above: Chris Lyne on trial site

CHRIS LYNE

ENHANCED EFFICIENCY FERTILISER TRIAL

Property location: Plantation Creek, Ayr

KEY POINTS

Aim - to compare the profitability and water quality benefits of using Entec and controlled release fertilisers

Factors

- Crop growing expenses
- Cane yield and CCS
- Soil types
- Application rates
- Timing of application
- Harvest timing
- Water quality monitoring: Auto flumes, Lysimeters and gas chambers.

The results will give an indication of the most profitable treatment and relative profitabilities of the remaining applied fertiliser rates. The full nitrogen cycle is being monitored, with loss mechanisms and water quality gains from the farming system identified. This provides a full farming system picture and allows the primary producer to make an educated decision for future nutrient management plans.

FOCUS ON

- The results from this trial will give a better understanding of how to effectively use these technologies to improve production measures such as yield, CCS and tonnes of sugar produced per hectare
- Using these more efficient formulations has the potential to not only increase production but also reduce N losses, resulting in improved water quality

THE PROJECT



What's happening at this site?

Chris is hosting the Project Catalyst Enhanced Efficiency Fertiliser Trial that is trialling enhanced efficiency fertilisers in the Burdekin and monitoring for water quality and economic outcomes.



Above: Auto flumes at Ayr Farming Project Catalyst site measuring runoff flux (volume x concentration)

QUOTES FROM THE GROWER



“ It’s smart to be involved in scientific, replicated trials as we are working with products with unproven benefits,” said Chris

“ We need to adjust the way we manage our farms and need scientific trials to aid our decisions.”

“ It’s been excellent being involved with the Project Catalyst trial, it has taught us we need to keep our options open and look at new ideas, then test with replicated trials.”

“ If it costs the same and there is no yield loss, but there is less nutrient run-off from the farm. Why wouldn’t you take on the practice for the environment?”

“I’m really interested in seeing the Water quality gains from the trial.”

BACKGROUND

After completing a Bachelor in Applied Science (Applied Agriculture in Irrigation), Chris began working in Hillston, NSW in 2003 for Westgate Irrigation.

Chris then made a change to the cotton industry as an irrigation supervisor for four and a half years, before moving to the Burdekin in 2008 with his wife Kate to take on the role of farm manager at Ayr Farming.

“The attraction of farming in the Burdekin is it’s unique irrigation scheme,” Chris said.

CHALLENGE

The window of opportunity to apply nutrients in a furrow irrigated system is finite and the cost of running machinery to apply two applications is not viable. The commercially available enhanced efficiency fertilisers may provide an alternative within the sugarcane production system.

Chris is working to determine the appropriate cost, product/blend for the soil type and application rate required to maintain or increase yield.

TREATMENTS

T1	Urea @ 220N
T2	Urea @ 180N
T3	Entec 2 180N
T4	CR25% @ 180N
T5	CR50% @ 180N

MONITORING

The Enhanced Nitrogen Efficiency Trials were designed to identify production differences between N formulations and ratios based on different soil types, application rates and application timings throughout the year.

The Burdekin-Bowen Integrated Floodplain Management Advisory Committee is monitoring the water quality of this trial. Samples are being analysed by the Department of Science, Information, Technology and Innovation

to identify the rate of release of nitrogen from applied fertiliser.

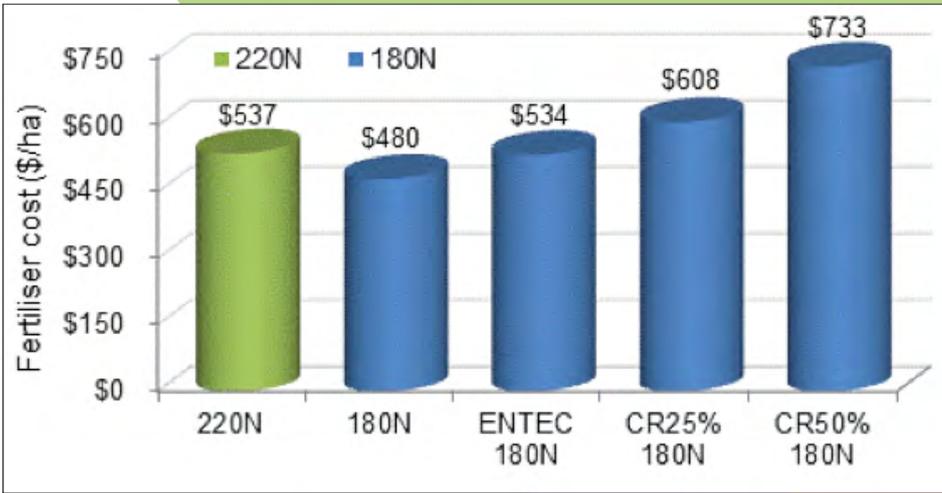
Inputs being recorded include: the amount of nitrogen applied in fertiliser blends and through irrigation water; losses through irrigation, measured using auto-flumes catching the first 20 runoff events; irrigation and rainfall, monitored to track the loss of nutrients from the full set of treatments; and soil profile measuring nitrogen losses through soil leaching and volatilisation using lysimeters and gas chambers.

ECONOMIC ANALYSIS

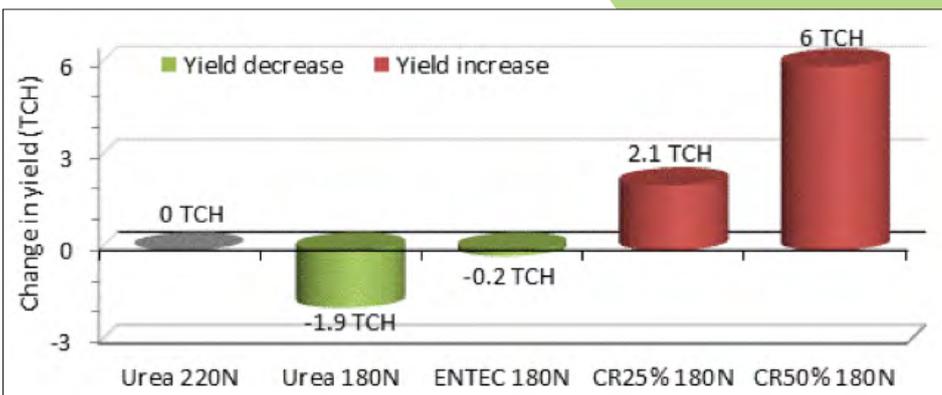
The economic analysis developed by delivery partner the Queensland Department of Agriculture and Fisheries will compare the profitability of each enhanced efficiency fertiliser treatment on Chris’s farm. Key factors include crop growing expenses, such as fertiliser product and application costs, and profitability comparing yields and CCS.



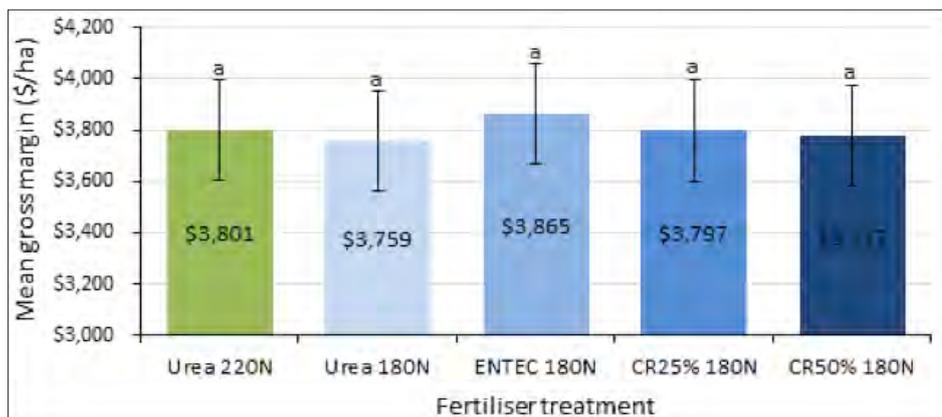
OUTCOMES TO DATE



Above: Figure 1



Above: Figure 2



Above: Figure 3

Figure 1 illustrates the fertiliser costs for each treatment. Comparing each of the treatments reveals that the urea treatment that applies 180 kilograms of N per hectare (180N) has the lowest fertiliser cost, while the controlled release treatment with a 50% blend (CR50% 180N) has the highest cost. Interestingly, the 220 kilograms of N per hectare treatment (the control) and the ENTEC® treatment, which delivers 40 kilograms less N per hectare, both have similar costs.

Figure 2 examines the yield change required for each treatment to maintain the same profitability as the control scenario (220kg N/ha) treatment, assuming a constant CCS level. As the urea treatment with 180kg/ha of N has the lowest cost, it can afford to take a hit to yield of almost 2 TCH before it becomes less profitable than the base scenario. On the other hand, the controlled release treatment with a 50 percent blend requires a yield increase of 6 TCH to maintain profitability.

Figure 3 compares the average gross margin of each fertiliser treatment during the second ratoon crop. The gross margin is a measure of profitability and is calculated by subtracting variable growing expenses (including fertiliser costs) from gross revenue. The error bars represent the 95% least significant difference (LSD), while the letters at the top of each LSD bar indicate statistical significance.

Comparing the treatment means shows that the ENTEC treatment attained the highest gross margin by \$64/ha. The control treatment achieved the second highest result followed very closely (\$4/ha) by the controlled release treatment with a 25% blend. The statistical analysis determined that differences between the treatment means were not statistically significant, which is illustrated by the overlapping 95% LSD bars.



Above: Drilling cores for lysimeter installation at Ayr Farming, Project Catalyst trial site.

